

ONTARIO MINISTRY OF ENVIRONMENT



36936000023029

1966 OPERATING SUMMARY

BURLINGTON

Elizabeth Gardens

**water pollution
control plant**

**TD
367
.A56
B875
1966
MOE**

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

**TD
367
.A56
B875
1966**

Burlington Elizabeth Gardens :
water pollution control plant.
81228



ONTARIO WATER RESOURCES COMMISSION
OFFICE OF THE GENERAL MANAGER

Members of the Burlington Elizabeth Gardens Local Advisory Committee
Town of Burlington.

Gentlemen:

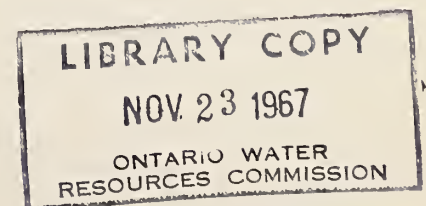
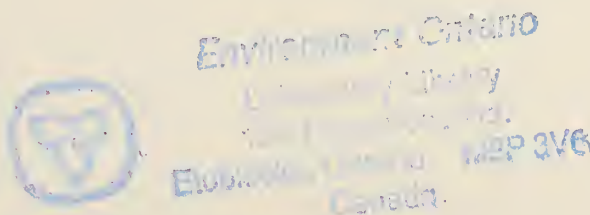
We are pleased to submit to you the 1966 Operating Summary for the
Burlington Elizabeth Gardens Water Pollution Control Plant, OWRC
Project No. 58-S-28.

It is hoped that our joint participation in efforts to combat water pollution
will have even more success in the coming year.

Yours very truly,

A handwritten signature in dark ink, appearing to read "D. S. Caverly".

D. S. Caverly,
General Manager.





ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

J. A. VANCE, LL.D.
CHAIRMAN

J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MACDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.


Dear Sir:

I am happy to present you with the 1966 Operating Summary for the Burlington Elizabeth Gardens Water Pollution Control Plant, OWRC Project No. 58-S-28.

The report offers a concise summary of operating data for the year and comparisons with previous years where these are applicable and significant.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.



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FOREWORD

● This operating summary contains complete information on the management of the project during 1966. It contains a concise review of the year's plant operation, significant financial details, and a visual presentation in graphs and charts of technical performance.

The information will be of value to interested parties in assessing the adequacy of the project at this time and its ability to meet future requirements.

The report is the result of co-operation by several groups within the Division of Plant Operations. These include the statistics section and the technical publications section. The Division of Finance and the draughting section of the Division of Sanitary Engineering were also closely associated with its publication.

The Regional Operations Engineer, however, has had the primary responsibility for the content, and will be happy to answer any questions regarding it.

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BURLINGTON
Elizabeth Gardens
water pollution control plant

operated for

THE TOWN OF BURLINGTON

by the

ONTARIO WATER RESOURCES COMMISSION

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VICE-CHAIRMAN: J. H. H. Root, M.P.P.

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DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director:	C. W. Perry
Regional Supervisor:	D. A. McTavish
Operations Engineer:	B. W. Hansler

801 Bay Street Toronto 5

'66 REVIEW

Burlington Elizabeth Gardens WPCP treated a total of 297.759 million gallons of sewage during the year, at an operating cost of \$23,894.31. The operating cost per million gallons and the cost per pound of BOD removed were \$80.25 and \$0.07 respectively.

The average daily flow during the year was 0.814 million gallons. The design flow of 0.75 million gallons per day was exceeded 53 percent of the time. Substantial increases in flow are received at the plant during rain fall periods. Flows in excess of 1.2 million gallons per day were given only primary treatment and chlorinated before discharge to Lake Ontario. Flows in excess of 1.2 million gallons per day are beyond the hydraulic capabilities of the final clarifier.

The average raw sewage BOD and suspended solids concentrations during the year were 127 ppm and 153 ppm respectively. The average effluent BOD and suspended solids concentrations were 20 ppm and 11 ppm respectively. On an average the BOD and suspended solids reductions were 84.0 percent and 93.0 percent respectively.

PROJECT COSTS

NET CAPITAL COST (Final)	
Long Term Debt to OWRC	\$ <u>382,773.39</u>
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1966	\$ <u>109,295.91</u>
Net Operating	\$ 23,894.31
Debt Retirement	13,887.00
Reserve	1,942.05
Interest Charged	<u>21,535.68</u>
TOTAL	\$ <u>61,259.04</u>

RESERVE ACCOUNT

Balance at January 1, 1966	\$ 11,475.71
Deposited by Municipality	1,942.05
Interest Earned	676.92
	<hr/>
Less Expenditures	-
	<hr/>
Balance at December 31, 1966	\$ <u>14,094.68</u>

MONTHLY OPERATING COSTS

MONTH	TOTAL EXPENDITURE	PAYROLL	FUEL	POWER	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	* SUNDRY	WATER
JAN	1018.32	921.06						97.26		
FEB	1980.32	889.00	126.00	298.19	224.03	39.45	149.84	29.23	126.50	98.08
MARCH	1732.50	913.67	71.26	272.05		41.49	88.05	84.76	261.22	
APRIL	2500.51	1654.02		295.22	224.03	73.02		37.14	119.10	98.08
MAY	1626.66	960.42		297.12		84.57		52.77	231.78	
JUNE	2365.78	1073.71	156.52	265.16		95.04		45.61	631.66	98.08
JULY	1757.98	952.83		238.43	228.38	59.07		6.12	273.15	
AUG	1971.36	1021.06		279.41	203.18	26.00	41.90	101.66	200.07	98.08
SEPT	2023.37	1450.61		244.25		92.15			236.36	
OCT	2021.36	1011.34			228.38	32.37		86.76	310.57	351.94
NOV	1899.30	988.51		273.24	56.39	302.41		28.01	201.70	49.04
DEC	2996.75	993.39	172.91	270.39	228.38	178.45		675.61	428.58	49.04
TOTAL	23394.31	12829.62	526.69	2733.46	1392.77	1024.02	279.79	1244.93	3020.69	842.34

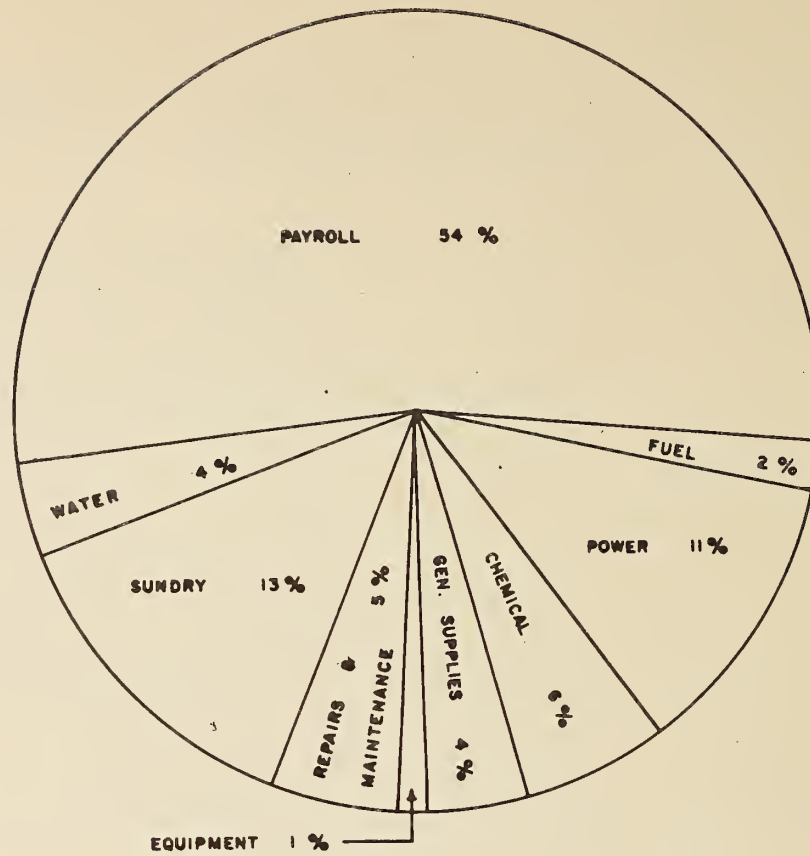
* SUNDRY INCLUDES SLUDGE HAULING COSTS WHICH WERE \$2,188.33

YEARLY OPERATING COSTS

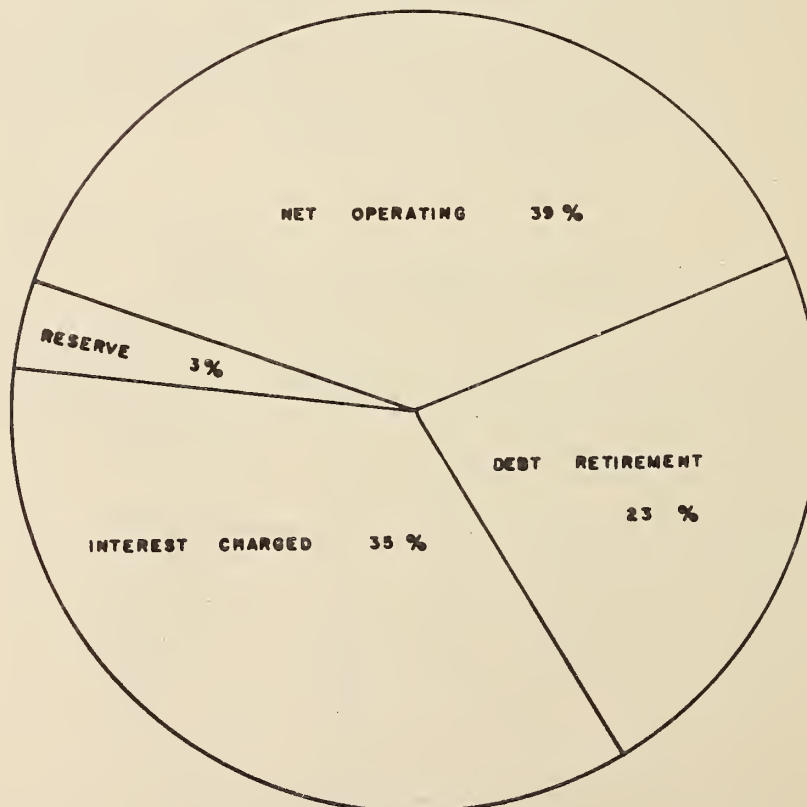
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER MILLION GALLONS	COST PER L.B. OF BOD REMOVED
1961	172,733	\$23,541	*	\$136.25	4 CENTS
1962	156,921	\$21,800	-	\$139.00	4 CENTS
1963	221,120	\$26,010	-	\$120.50	4 CENTS
1964	235,486	\$21,958	7.78	\$ 93.24	6 CENTS
1965	299,865	\$21,966.58	7.92	\$ 73.25	6 CENTS
1966	297,759	\$23,894.31	8.15	\$ 80.25	7 CENTS

* BASED ON 3.9 PERSONS PER FAMILY AND TOTAL COST OF ALL BURLINGTON PLANTS

1966 OPERATING COSTS



TOTAL ANNUAL COST



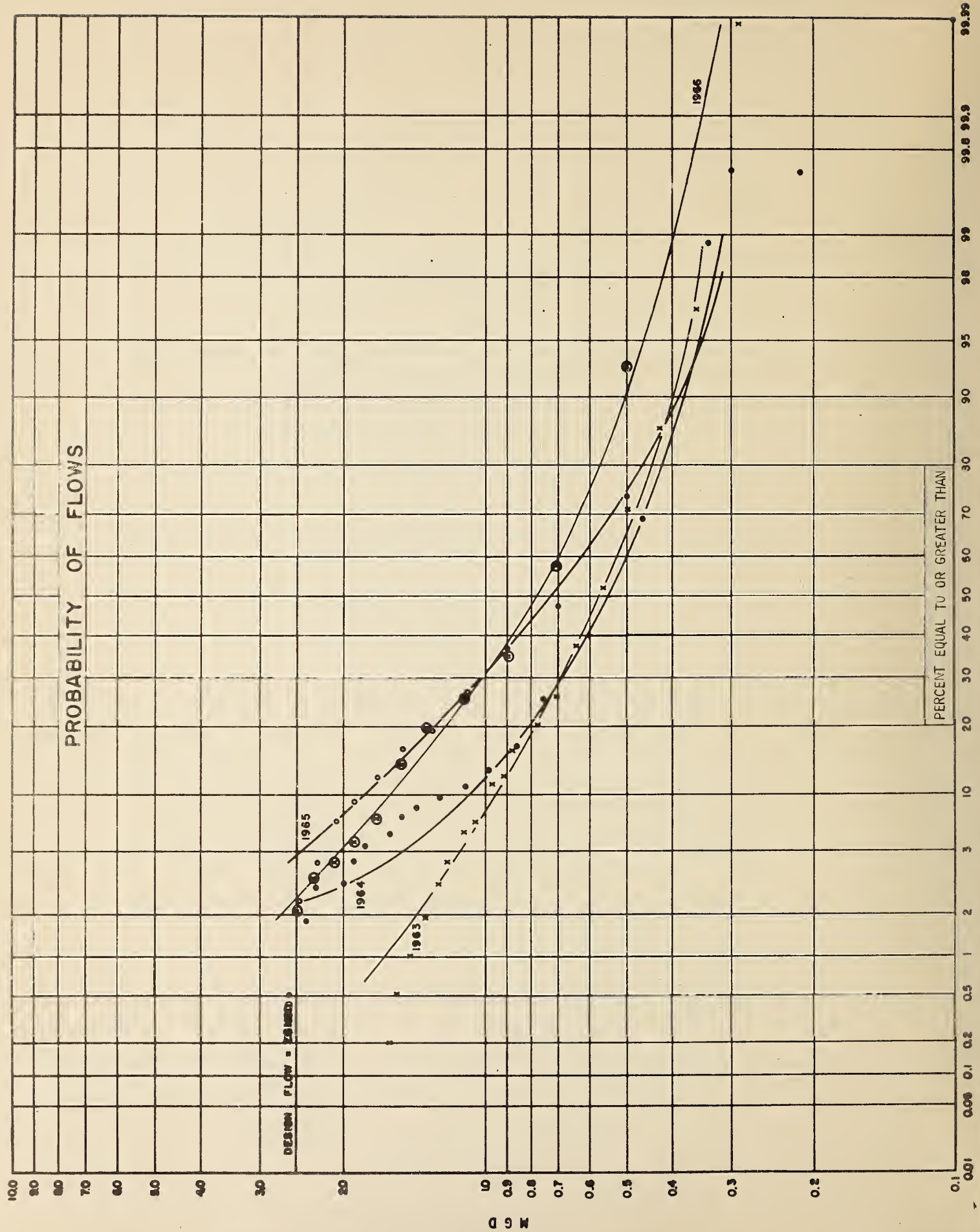
Process Data

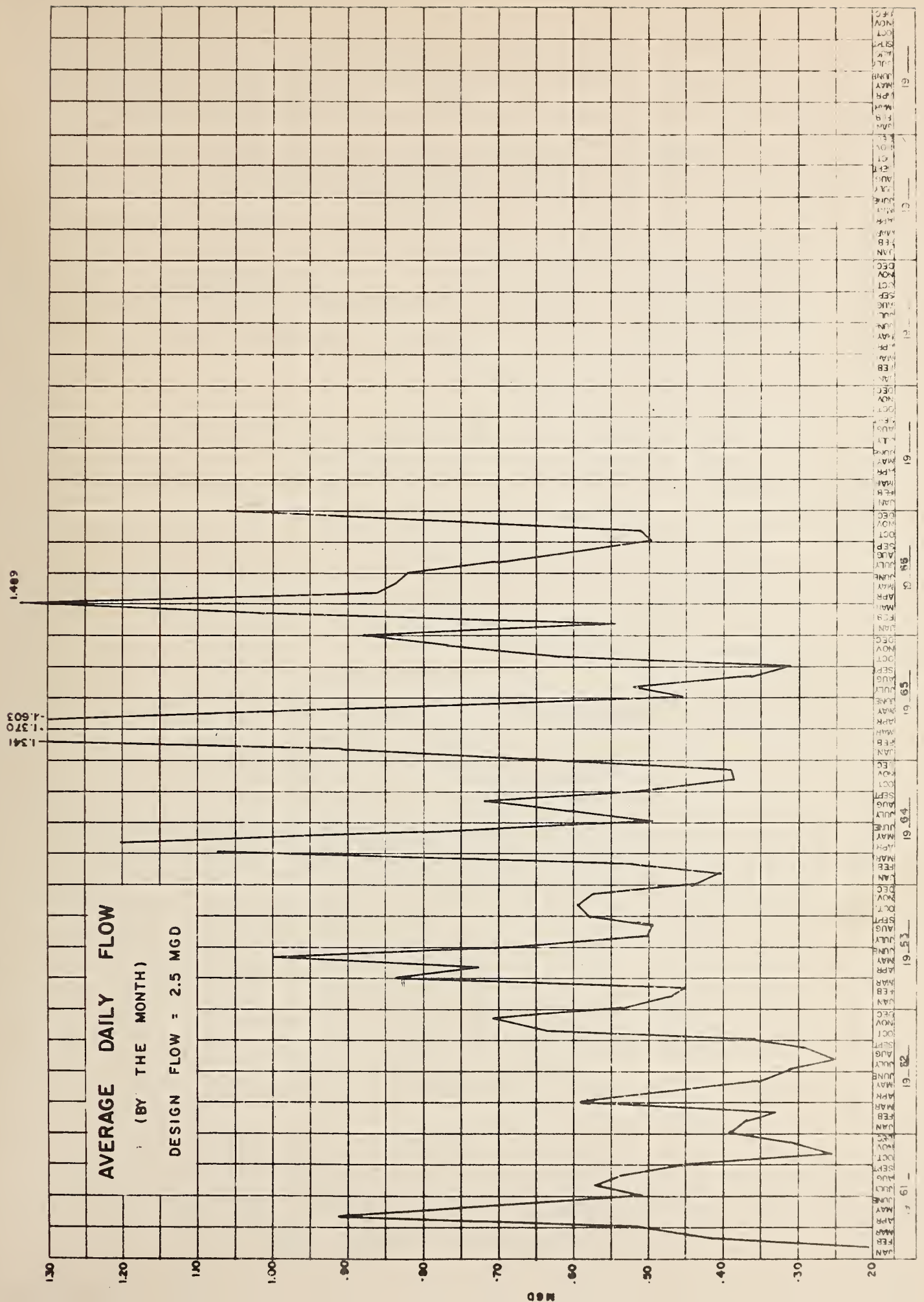
Average daily flows presented on a probability basis and on a monthly average basis can be found on the following two graphs.

The maximum and minimum daily flows averaged on a monthly basis were 1.489 million gallons and 0.49 million gallons respectively.

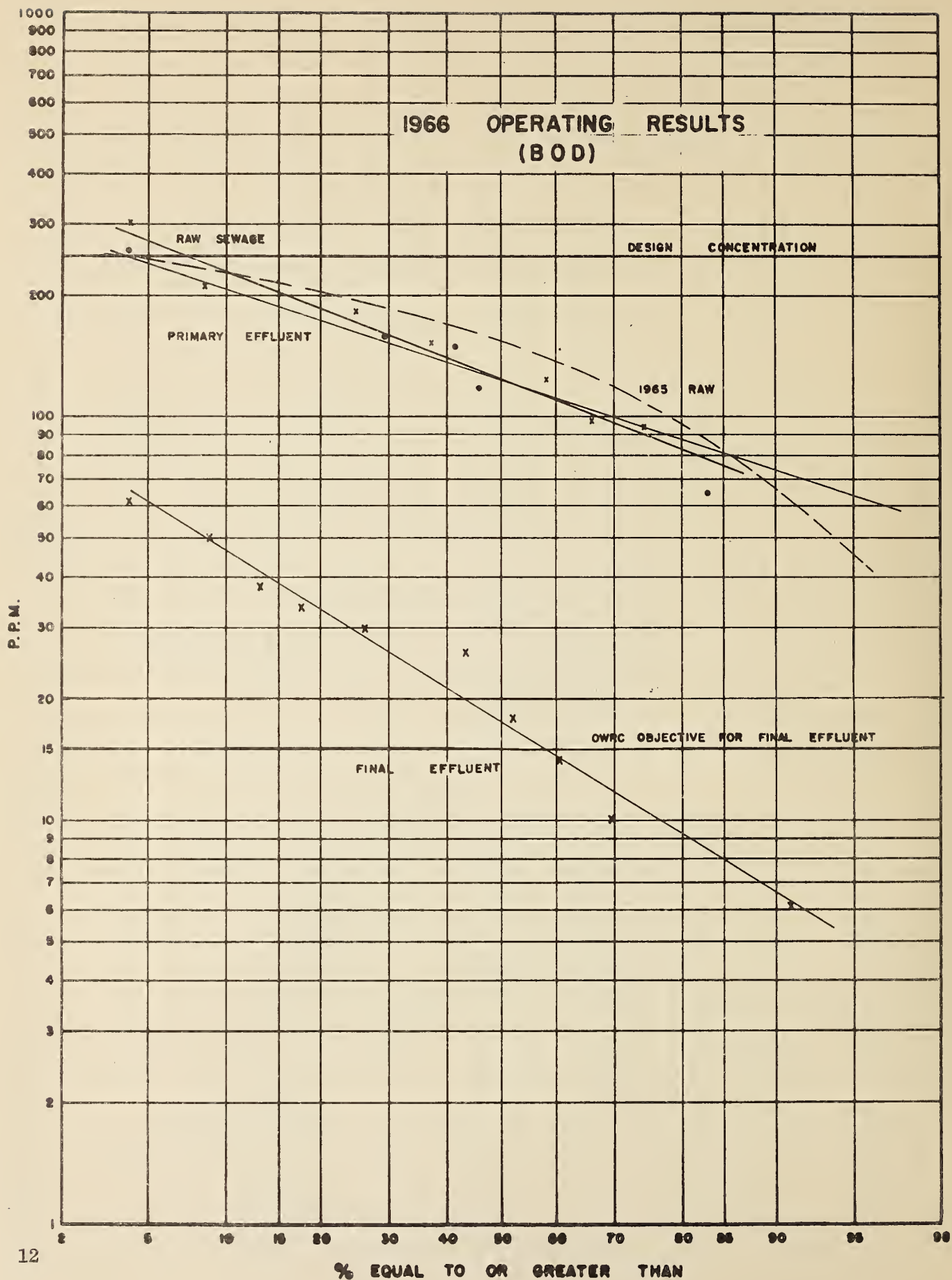
The design flow of 0.75 million gallons per day was exceeded 53 percent of the time.

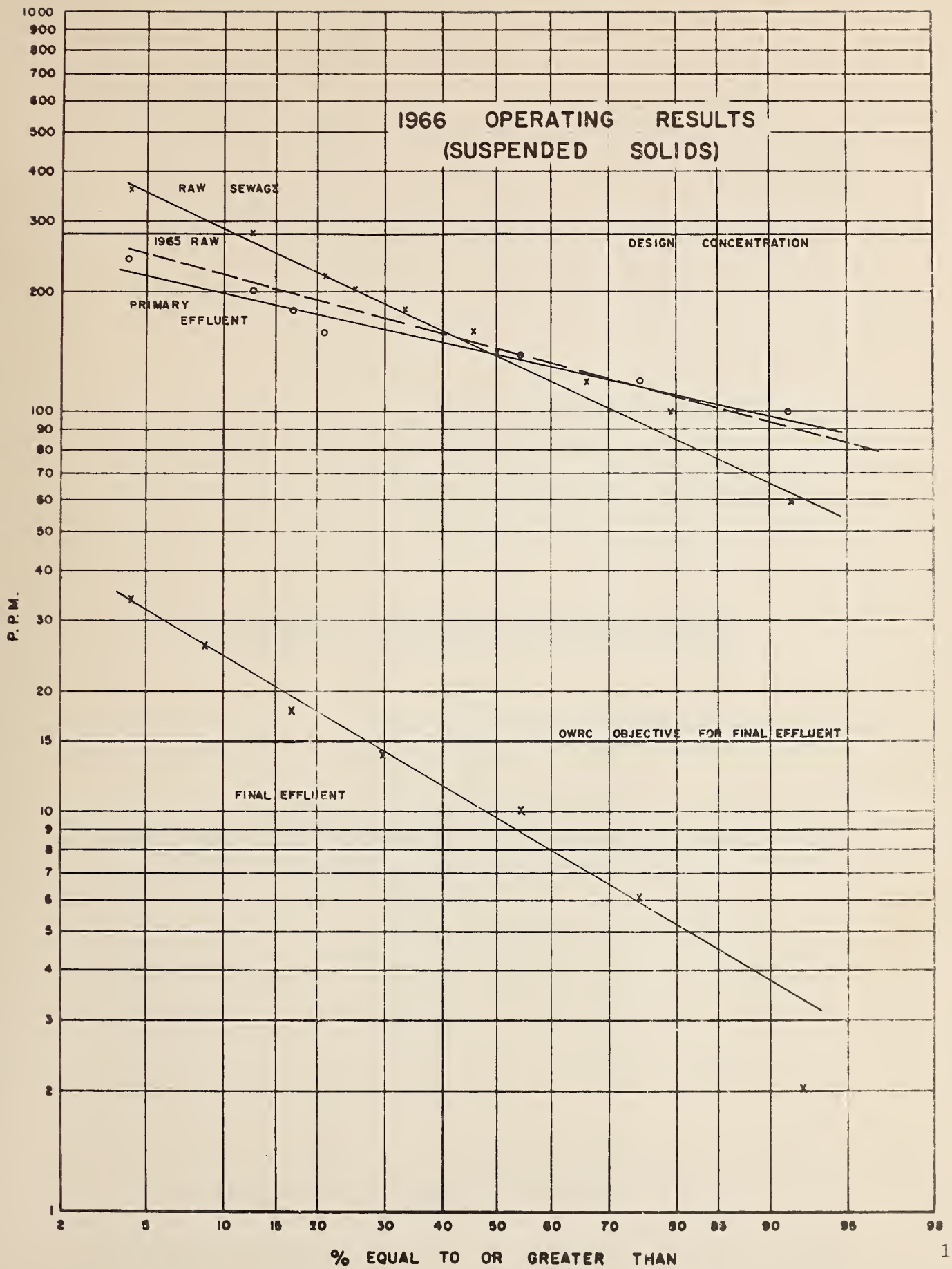
On an average throughout the year the daily flow was 0.814 million gallons.

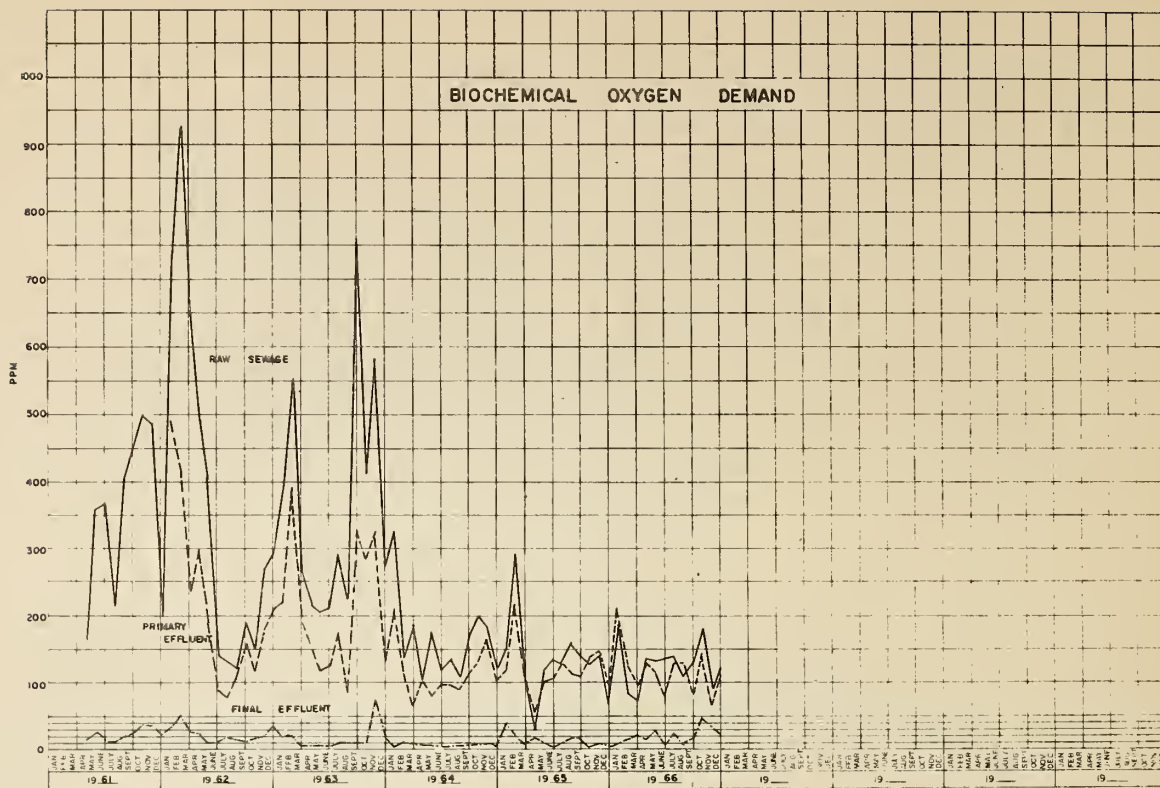




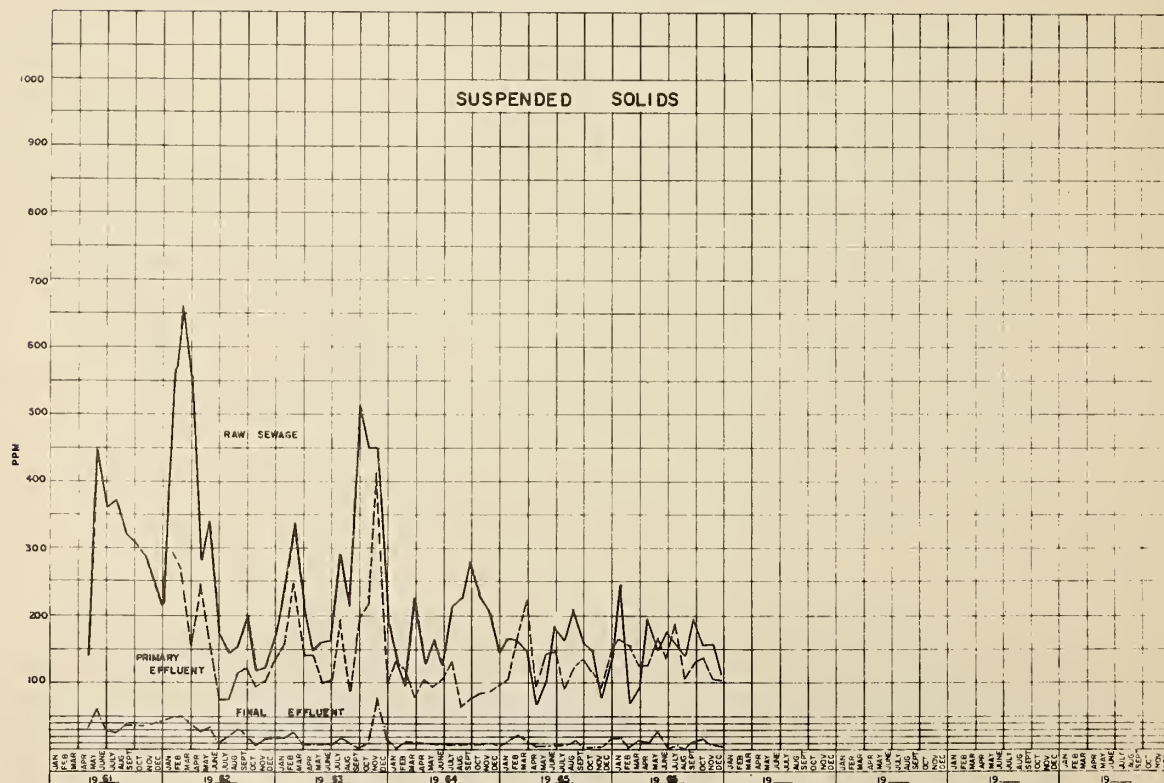
1966 OPERATING RESULTS (BOD)







MONTHLY VARIATIONS



GRIT, B.O.D AND S.S. REMOVAL

MONTH	B. O. D.				S. S.				GRIT REMOVAL CU. FT.
	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	INFLUENT PPM.	EFFLUENT PPM.	% REDUCTION	TONS REMOVED	
JAN.	186	10	94.5	14.8	245	18	92.5	19.1	15
FEB.	86	15	82.5	10.7	68	5	92.5	9.5	21
MAR.	73	21	71.5	12.0	01	13	85.5	17.6	-
APR.	139	14	90.5	16.2	198	10	94.5	24.3	28
MAY	134	28	78.5	13.6	150	25	83.5	16.1	68
JUNE	138	9	93.5	15.9	175	4	97.5	21.0	50
JULY	140	26	81.5	12.4	154	7	95.5	16.0	30
AUG.	107	11	89.5	8.9	137	4	97.0	12.3	30
SEPT.	130	17	86.9	8.4	195	12	94.0	13.7	72
OCT.	180	48	73.5	10.4	157	18	88.5	11.0	9
NOV.	91	*20	78.0	8.5	158	8	95.0	17.9	50
DEC.	122	23	81.0	16.5	113	4	87.0	18.1	52
TOTAL	-	-	-	159.3	-	-	-	211.4	425
AVG.	127	20	84.0	13.3	153	11	93.0	17.6	35

COMMENTS

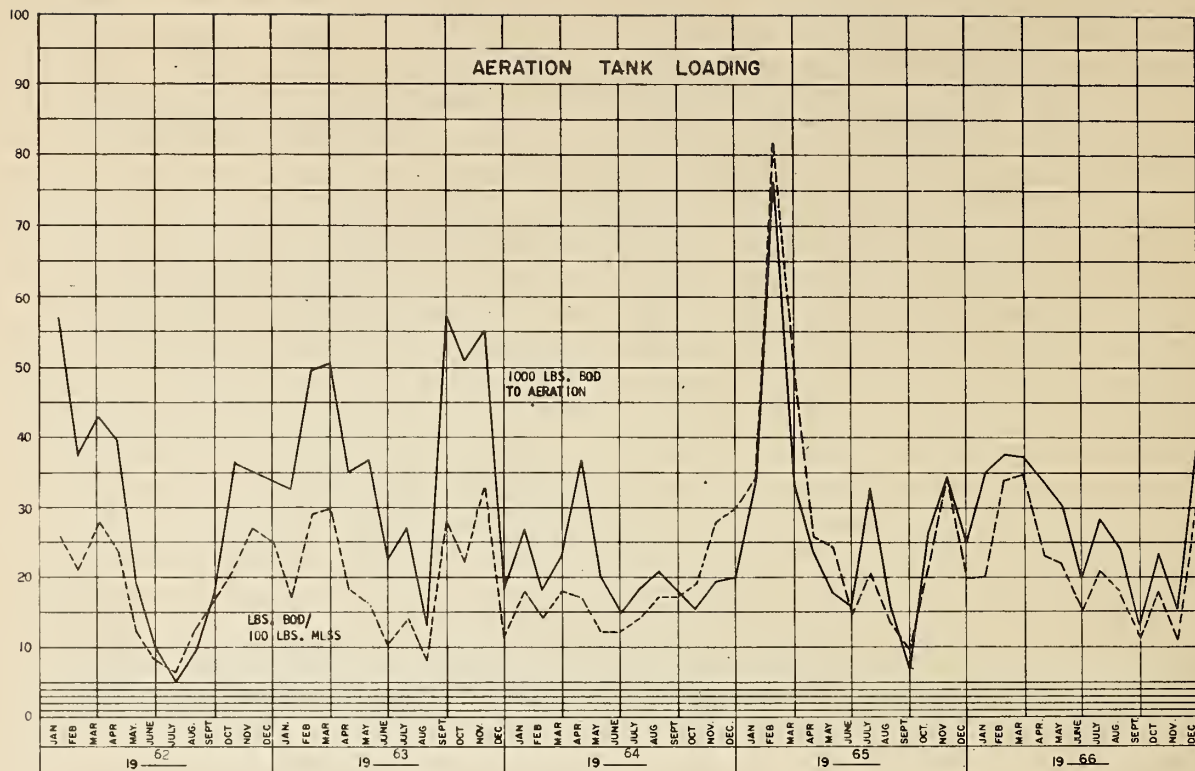
Raw sewage, primary effluent and final effluent BOD and suspended solids concentrations are presented on an average per month basis and on a probability basis on the four previous graphs.

The average raw sewage BOD and suspended solids concentrations during the year were 127 ppm and 153 ppm respectively. The average effluent BOD and suspended solids concentrations during the year were 20 ppm and 11 ppm respectively. On an average the BOD and suspended solids reductions were 84.0 percent and 93.0 percent respectively.

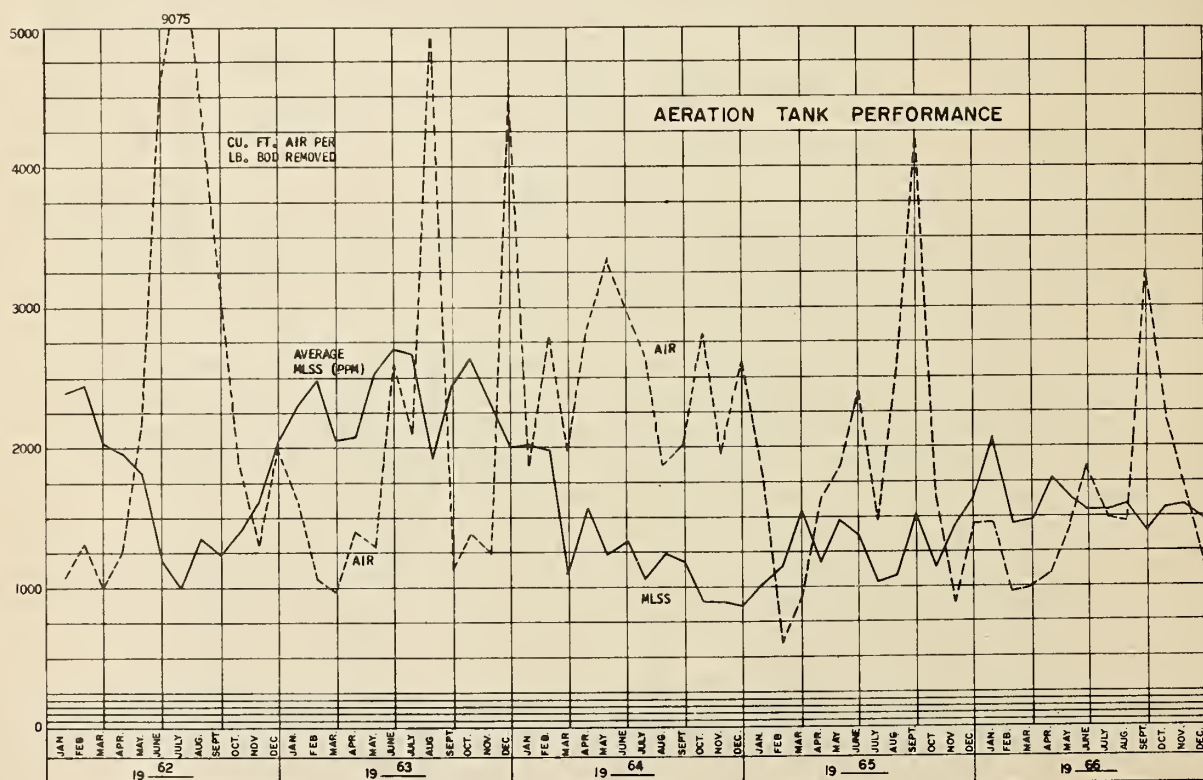
The design raw sewage BOD concentration of 253 ppm was exceeded 8 percent of the time. The design raw sewage suspended solids concentration of 280 ppm was exceeded 11 percent of the time.

The Ontario Water Resources Commission's objective of not more than 15 ppm of BOD or suspended solids concentration in the final effluent was exceeded 58 and 27 percent of the time respectively.

During the year a total of approximately 425 cubic feet of grit were removed.



MONTHLY VARIATIONS



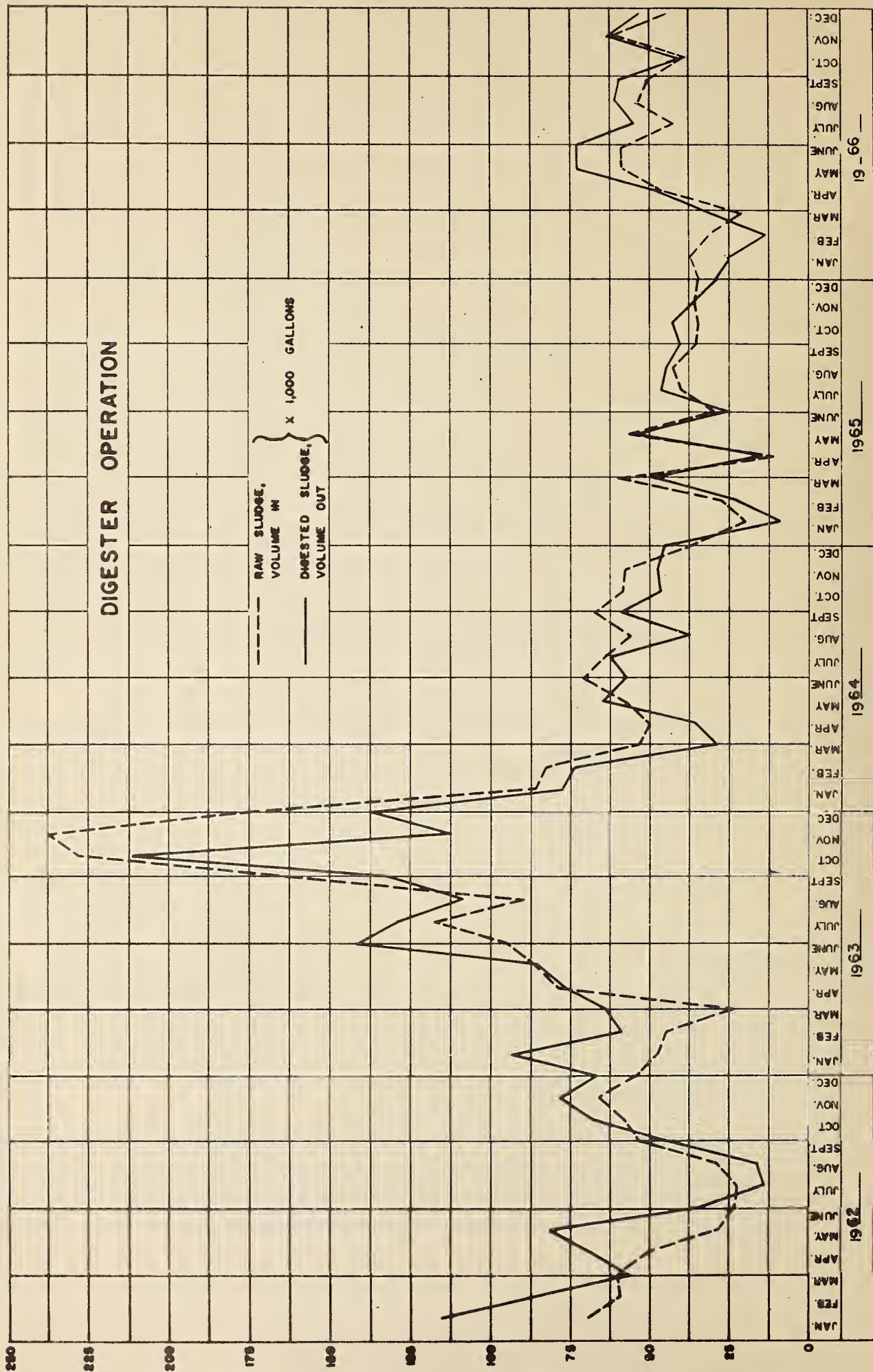
AERATION SECTION

MONTH	PRIM. EFFL B.O.D. PPM.	ML.SS. PPM.	LBS. BOD. PER 100 LBS. M. L. S. S.	CUBIC FEET AIR PER LB. BOD. REMOVED
JANUARY	208	2006	20	1004
FEBRUARY	126	1462	34	906
MARCH	94	1474	35	990
APRIL	132	1782	23	1058
MAY	119	1629	22	1429
JUNE	80	1543	15	1856
JULY	129	1545	21	1493
AUGUST	130	1578	18	1467
SEPTEMBER	86	1395	11	3232
OCTOBER	147	1554	18	2173
NOVEMBER	63	1678	11	-
DECEMBER	112	1462	30	1126
TOTAL	-	-	-	-
AVERAGE	119	1592	22	1521

COMMENTS

The total pounds of BOD per month received by the aeration section and pounds of BOD per 100 pounds of mixed liquor suspended solids averaged on a monthly basis are plotted on a graph at left. On the same page cubic feet of air per pounds of BOD removed and the daily average mixed liquor suspended solids concentrations are plotted, both also averaged on a monthly basis.

The average pounds of BOD per 100 pounds of mixed liquor suspended solids was 22 which is acceptable for normal operation. The average cubic feet of air per pound of BOD removed was 1521 which is slightly greater than the maximum recommended value of 1500. The average BOD in the primary effluent was 119 ppm and the average mixed liquor suspended solids concentration in the aeration section was 1592 ppm.



DIGESTER OPERATION

MONTH	SLUDGE TO DIGESTERS			SLUDGE FROM DIGESTERS			GAS PRODUCED 1000'S Cu. Ft.
	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	1000'S CU. FT.	% SOLIDS	% VOL. MAT.	
JAN.	5.96	-	-	4.04	-	-	-
FEB.	5.12	-	-	2.17	-	-	-
MAR.	3.50	-	-	5.10	-	-	-
APR.	7.65	4.90	-	7.78	3.37	-	-
MAY	9.38	-	-	11.80	-	-	-
JUNE	9.48	-	-	11.80	-	-	-
JULY	7.01	-	-	9.00	-	-	-
AUG.	8.92	-	-	9.94	-	-	-
SEPT.	8.35	-	-	9.62	-	-	-
OCT.	6.55	4.60	3.45	6.40	3.35	1.76	-
NOV.	10.11	-	-	10.21	-	-	-
DEC.	7.65	-	-	8.69	-	-	-
TOTAL	89.68	-	-	96.55	-	-	-
AVG.	7.47	4.75	3.45	8.05	3.36	1.76	-

COMMENTS

Sludge volumes per month to and from the digester are plotted on the accompanying graph. On average the volatile solids were reduced by 41.9 percent which indicates that the digester operated efficiently throughout the year.

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	16.848	465	2.76
FEBRUARY	30.062	547	1.82
MARCH	46.145	568	1.23
APRIL	25.856	432	1.67
MAY	25.765	471	1.83
JUNE	24.611	575	2.34
JULY	21.837	552	2.53
AUGUST	18.570	488	2.63
SEPTEMBER	14.942	568	3.80
OCTOBER	15.841	642	4.05
NOVEMBER	23.888	619	2.59
DECEMBER	33.394	658	1.97
TOTAL	297.759	6585	-
AVERAGE	24.813	549	2.21

COMMENTS

Throughout the year a minimum chlorine residual of 0.5 ppm was maintained with an average dosage rate of 2.21 ppm.

CONCLUSIONS

The average BOD and suspended solids removals were 84.0 percent and 93.0 percent. The average daily flow was 0.814 million gallons which is 8.5 percent greater than the design flow. Throughout the year the plant staff operated a clean, attractive and efficient plant for the Town of Burlington.

RECOMMENDATIONS

The storm flows received at the plant were in excess of the design flow quite often. This suggests a serious infiltration problem. It is therefore recommended that the Town of Burlington take the necessary steps to have an infiltration study of the sanitary sewers conducted. The correction of the infiltration problem would reduce the hydraulic load at the plant during storm periods and consequently prevent primary effluent and untreated sewage from reaching Lake Ontario.

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Burlington Elizabeth Gardens :
water pollution control plant.

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Environment Ontario
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